Electronic supporting information for

Efficient electrochemical water splitting using copper molybdenum sulfide anchored Ni foam as high-performance bifunctional catalyst

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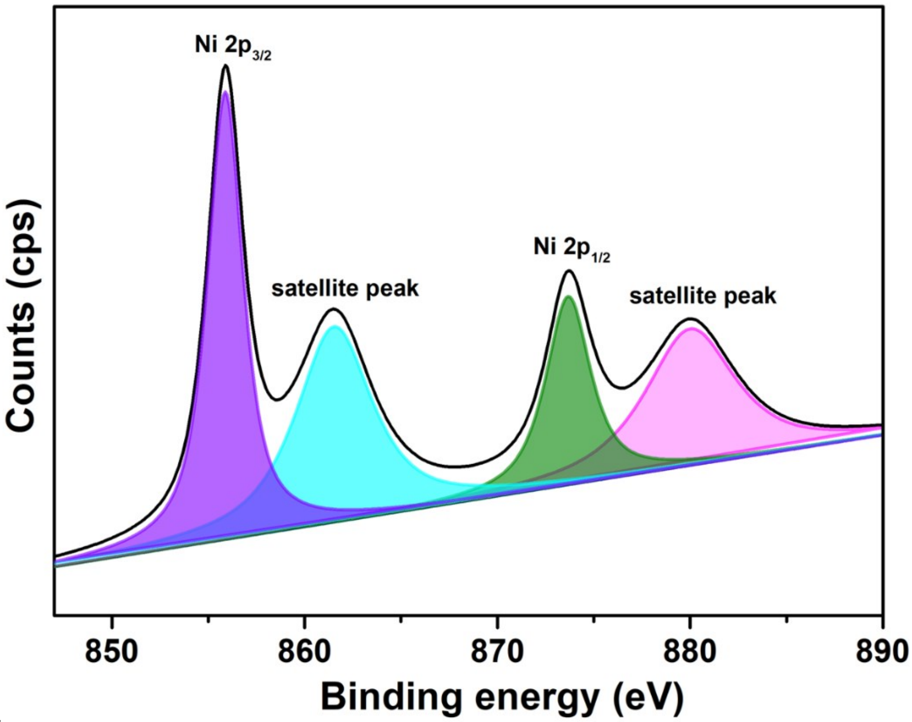

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Figure S1. XPS core level spectrum of spectrum of Ni 2p in CMS/Ni foam

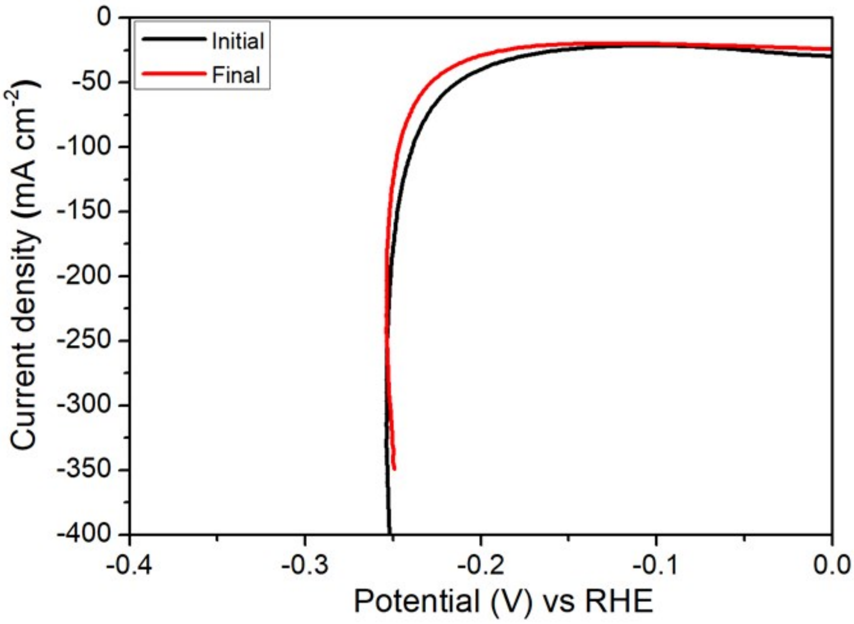

Figure S2. Linear sweep voltammogram analysis of CMS/Ni foam for initial and after durability test of Electrochemical HER activity

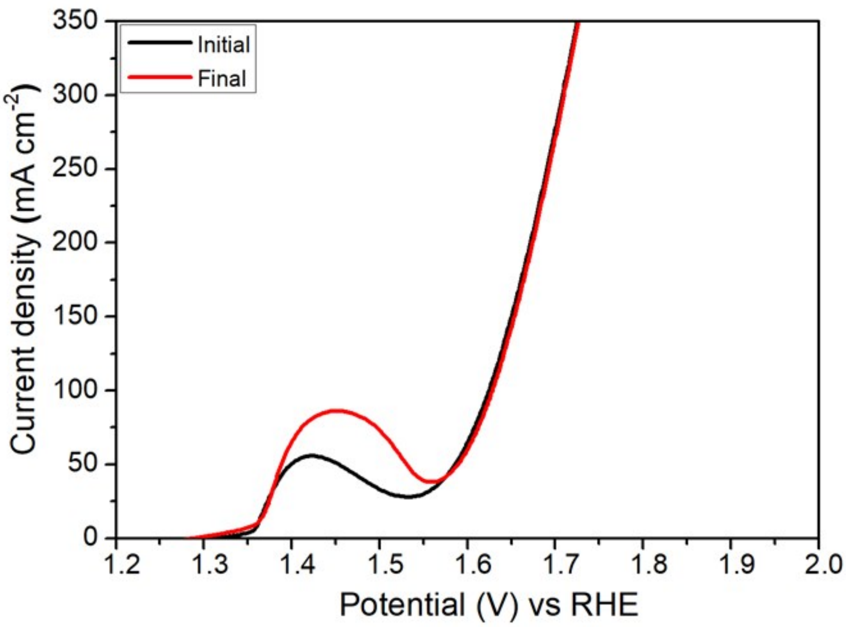

Figure S3. Linear sweep voltammogram analysis of CMS/Ni foam for initial and after durability test of Electrochemical OER activity

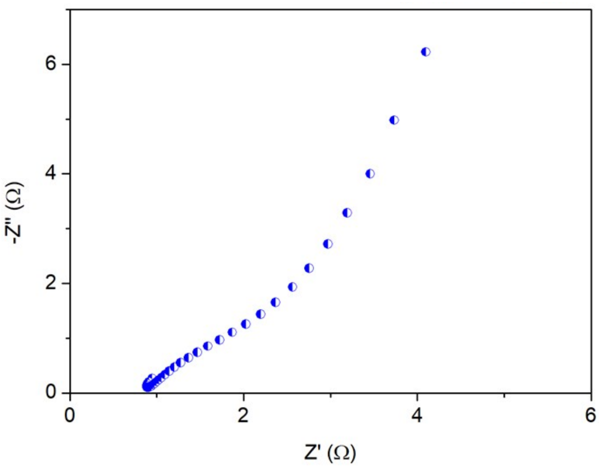

Figure S4. Electrochemical impedance analysis: Nyquist plot of CMS/Ni electrocatalyst.

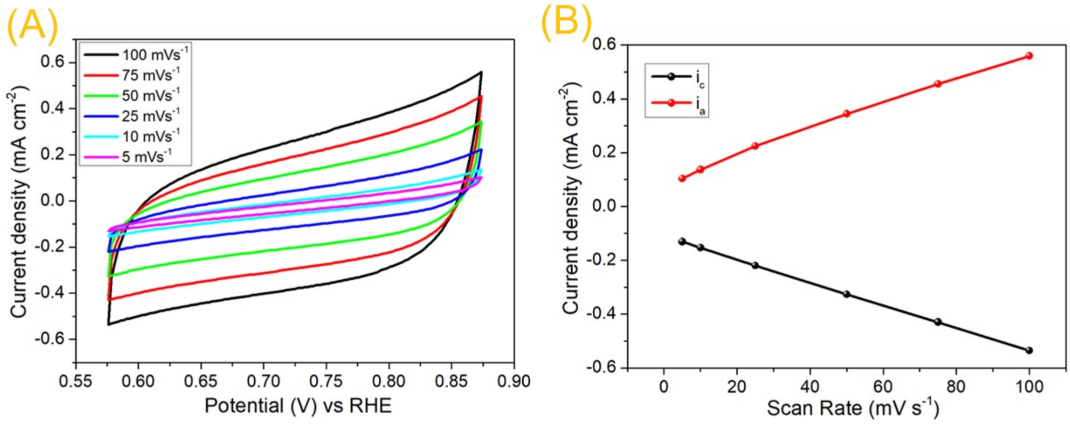

Figure S5 (A) Cyclic voltammograms for CMS/Ni electrocatalyst at various scan rate. (B) The plot of scan rate vs current density of CMS /Ni electrocatalyst in 1 M KOH electrolyte.

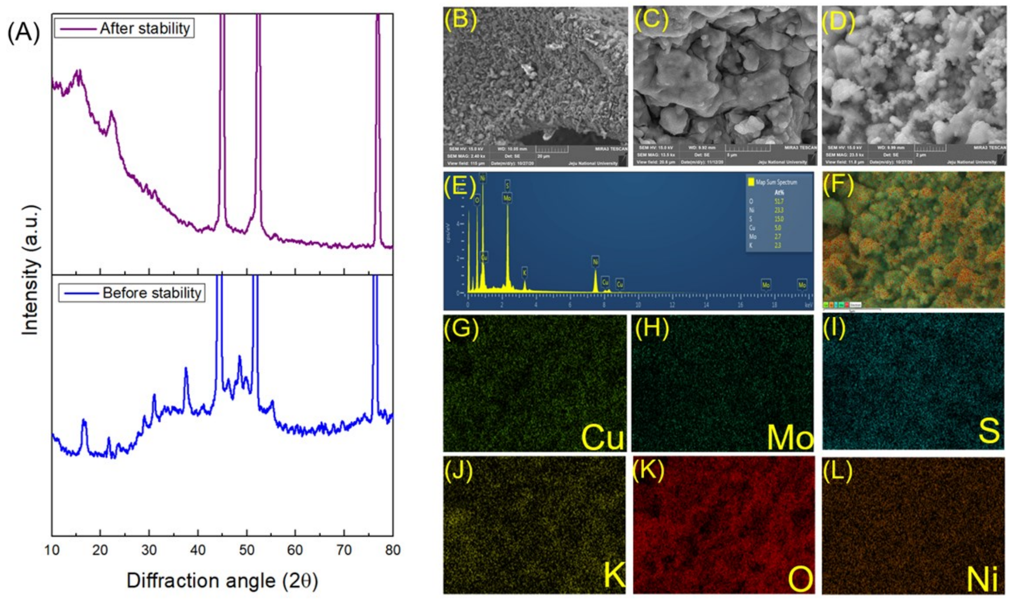

Figure S6. (A) X-ray diffraction pattern of CMS/Ni nanostructures before and long-term stability tests, (B-D) Field emission scanning electron micrographs, (E) EDX spectrum, (F-L) elemental maps of CMS/Ni electrode after long-term electrochemical stability.

Table S1. Comparison of recently reported HER electrocatalysts performance with the as synthesized CMS/Ni foam electrocatalyst in electrolyte of 1 M KOH

Catalyst	Substrate	Electrolyte	Current density (mA cm^{-2})	Overpotential (mV)	Reference
$NiCo_2S_4$ NW/NF	NF	1 M KOH	10	210	[1]
CoS_x/Ni_3S_2@NF	NF	1 M KOH	10	240	[2]
CoS_x/Ni_3S_2@NF	NF	1 M KOH	10	204	[3]
Ni_3S_2 nanosheet arrays	NF	1 M KOH	10	223	[4]
CoS-CC	CC	1 M KOH 0.5 M H_2SO_4	10	192 212	[5]
Nickel cobalt sulfide	CFC	1 M KOH	10	282	[6]
Co_9S_8 HNSs	Carbon paper	1 M KOH	10	267	[7]
Co_3S_4 HNSs	Carbon paper	1 M KOH	10	221	[7]
Ni−Co−S	FTO	1 M K_2HPO_4	10	280	[8]
Co@Co_3O_4-NC	GCE	1 M KOH	10	221	[9]
NiS2 HMSs	GCE	1 M KOH	10	219	[7]
Cu_2MoS_4/MWCNT	GCE	0.5 M H_2SO_4	10	247	[10]
Pt/C	GCE	1 M KOH	10	32	[1]
Copper Molybdenum Sulphide	**Ni Foam**	**1 M KOH**	**50**	**213**	**This work**

Table S2. Comparison of recently reported OER electrocatalysts performance with the as synthesized CMS/Ni foam electrocatalyst in electrolyte of 1 M KOH

Catalyst	**Substrate**	**Electrolyte**	**Current density (mA cm^{-2})**	**Overpotential (mV)**	**Reference**
Ni_3S_4(NiS/NF) NiS-10	Ni foam	1 M KOH	20 20	320 344	[11]
Mo-Ni-Se@NF	NF	1 M KOH	100	397	[12]
NiMoN-400 NRs Co-NiMoN-400 NRs	NF	1 M KOH	10	326 282	[13]
$Cu_{1-x}Ni_xS$/NF	NF	1 M KOH	20	350	[14]
FeS	NF	1 M KOH	50	430	[15]
CoS	NF	1 M KOH	50	530	[15]
NiS	NF	1 M KOH	50	530	[15]
CuS	NF	1 M KOH	50	510	[15]
Cu_2S-Ni_3S_2/NF	NF		10	329	[16]
Ni_3S_2 films on NF	NF	1 M KOH	10	312	[4]
Co_9S_8 HNSs	Carbon paper	1 M KOH	10	342	[7]
MoS_2@CoO	CC	1 M KOH	10	325	[17]
Co_9S_8@MoS_2	GC	1 M KOH	10	340	[18]
NiCoS-3 polyhedron	GC	1 M KOH	10	320	[19]
Co@Co_3O_4-NC	GC	1 M KOH	10	391	[9]
IrO2	GCE	1 M KOH	10	340	[1]
Copper Molybdenum Sulphide	**Ni Foam**	**1 M KOH**	**50**	**350**	**This work**

Table S3. Comparison of recently reported bifunctional electrocatalysts performance with the as synthesized CMS/Ni foam electrocatalyst in electrolyte of 1 M KOH

Catalyst	**Electrolyte**	**Current density (mA cm^{-2})**	**Voltage (V)**	**Reference**
NiS/NF	1 M KOH	10	1.61	[11]
$NiCo_2S_4$ NW/NF	1 M KOH	10	1.63	[1]
Co_3S_4-L		10	1.63	[20]
$Cu_{1-x}Ni_xS$/NF	1 M KOH	10	1.64	[14]
NiS/Ni foam		10	1.64	[21]
$CoNi_2S_4/Ni_3S_2$@NF	1 M KOH	10	1.65	[22]
C_2M_1S	1 M KOH	10	1.668	[23]
NiCo-LDH/NF		10	1.66	[24]
Co_9S_8@MoS_2	1 M KOH	10	1.67	[18]
Ni3S_2 films on NF	1 M KOH	10	1.68	[25]
CoS_x/Ni_3S_2@NF	1 M KOH	50	1.69	[2]
CNT@NiSe/SS	1 M KOH	10	1.71	[26]
Ni_3S_2 /NF	1 M KOH	13	1.76	[4]
Cu_2S-Ni_3S_2/NF	1 M KOH	10	1.77	[16]
Co@Co_3O_4-NC	1 M KOH	10	2.004	[9]
Copper Molybdenum Sulphide	**1 M KOH**	**10**	**1.62**	**This work**

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